AF/2834

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Shiraishi et al.	Examiner:	J. Aguirrechea
Serial No.:	10/055,640	Group Art Unit:	2834
Filed:	1/22/02	Docket:	10873.867US01
Confirmation No.:	9430	Notice of Allow. Date:	
Due Date:	10/27/04		

Title: PIEZOCOMPOSITE, ULTRASONIC PROBE FOR ULTRASONIC DIAGNOSTIC EQUIPMENT, ULTRASONIC DIAGNOSTIC EQUIPMENT, AND METHOD FOR PRODUCING PIEZOCOMPOSITE

CERTIFICATE UNDER 37 CFR 1.8:
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on October 18, 2004.

By: Linda Engel
Name: Linda Engel

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

23552
PATENT TRADEMARK OFFICE

Sir:

We are transmitting herewith the attached:

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Please consider this a PETITION FOR EXTENSION OF TIME for a sufficient number of months to enter these papers or any future reply, if appropriate. Please charge any additional fees or credit overpayment to Deposit Account No. 13-2725. A duplicate of this sheet is enclosed.

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By:
Name: Douglas P. Mueller
Reg. No.: 30,300
DPM/le

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	SHIRAISHI et al.	Examiner:	J. Aguirrechea
Serial No.:	10/055,640	Group Art Unit:	2834
Filed:	JANUARY 22, 2002	Docket No.:	10873.867US01
Title:	PIEZOCOMPOSITE, ULTRASONIC PROBE FOR ULTRASONIC DIAGNOSTIC EQUIPMENT, ULTRASONIC DIAGNOSTIC EQUIPMENT, AND METHOD FOR PRODUCING PIEZOCOMPOSITE		

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By: Linda Engel
Name: Linda Engel

APPELLANTS' BRIEF ON APPEAL

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Brief is presented in support of the Appeal filed August 27, 2004, from the final rejection of Claims 1-13, 34, and 35 of the above-identified application, as set forth in the Office Action mailed March 29, 2004.

A check for $340.00 to cover the required fee for filing this Brief is enclosed. An original and two copies of the Brief are enclosed herewith.

10/22/2004 FFANAIA2 00000025 10055640
01 FC:1402 340.00 OP

I. REAL PARTY OF INTEREST

This application is assigned to Matsushita Electric Industrial Co., Ltd. of Osaka, Japan.

II. RELATED APPEALS AND INTERFERENCES

Appellants, the assignee and their representative are unaware of any appeals or interferences that would directly affect, be directly affected by, or have a bearing on the outcome of the present appeal.

III. STATUS OF CLAIMS

Claims 1-35 are pending, with claims 14-33 being withdrawn from consideration. Claims 1-13, 34, and 35 stand rejected and are the subject of this Appeal. The text of the claims on appeal is appended hereto (Appendix 1, Claims).

IV. STATUS OF AMENDMENTS

No amendments were filed after the final Office Action mailed March 29, 2004.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Claims 1, 12, 13, and 35 are independent. The subject matter of these claims is summarized below, with reference to the drawings and the specification that exemplify support for the independent claims.

A. Independent Claim 1

Claim 1 is directed to a piezocomposite **6** comprising a plurality of composite sheet units **50**. *See* page 26, lines 32-36. Each of the sheet units includes a resin layer **22** and a plurality of sintered piezoelectric thin wires **33** arranged in a uniform direction on a surface of the resin layer **22**. *See* Figure 11 and page 26, lines 32-36. The sintered piezoelectric thin wires **33** are positioned between the resin layers **22**. *See* Figure 12. The plurality of composite sheet units **50** are cut in a direction perpendicular to a lengthwise direction of the sintered piezoelectric thin wires **33**. *See* Figure 13 and page 26, lines 23-31. In each of the composite sheet units **50**, the sintered piezoelectric thin wires **33** are arranged on a surface of each resin layer **22** so as to have void portions between adjacent ones of the sintered piezoelectric thin wires **33**. *See* Figure 11 and page 25, lines 26-37. The plurality of composite sheet units **50** are laminated and the laminated composite sheets are integrated. *See* Figure 12 and page 26, lines 7-22.

B. Independent Claim 12

Independent claim 12 is directed to an ultrasonic probe **100** for an ultrasonic diagnostic equipment. *See* Figure 22 and page 46, line 25 through page 47, line 10. A piezocomposite **9** is obtained by laminating and integrating a plurality of composite sheet units **50**, each of which includes a resin layer **22** and a plurality of sintered piezoelectric thin wires **33** arranged in a uniform direction on a surface of the resin layer **22**. *See* Figure 13 and page 26, lines 23-31. The sintered piezoelectric thin wires **33** are positioned between the resin layers **22**. *See* Figure

12. The composite sheet units **50** are cut in a direction perpendicular to a lengthwise direction of the sintered piezoelectric thin wires **33**. *See* Figure 13 and page 26, lines 23-31. The plurality of composite sheet units **50** are laminated and the laminated composite sheets are integrated. *See* Figure 12 and page 26, lines 7-22. Electrodes **92** are provided on both sides of the piezocomposite **9**. *See* Figure 22 and page 46, line 25 through page 47, line 10. An acoustic matching layer **90** is provided. *Id.* A backing member **91** is provided. *Id.* The piezocomposite **9** is interposed between the acoustic matching layer **90** and the backing member **91**. *Id.* One of the electrodes **92** is grounded, while the other electrode **92** is connected as a driving electrode with a transmitting/receiving circuit **93**. *Id.*

C. Independent Claim 13

Independent claim 13 is directed to an ultrasonic diagnostic equipment. An ultrasonic probe **100** for an ultrasonic diagnostic equipment is connected with an ultrasonic diagnostic equipment main body **101**. *See* Figure 23 and page 47, lines 12-28. The ultrasonic probe includes a piezocomposite **9**. The piezocomposite **9** is obtained by laminating and integrating a plurality of composite sheet units **50**. *See* Figure 12 and page 26, lines 7-22.

Each composite sheet unit **50** includes a resin layer **22** and a plurality of sintered piezoelectric thin wires **33** arranged in a uniform direction on a surface of the resin layer **22**, so that the sintered piezoelectric thin wires **33** are positioned between the resin layers **22**. *See* Figure 11 and page 26, lines 32-36. Each composite sheet unit **50** is cut in a direction perpendicular to a lengthwise direction of the sintered piezoelectric thin wires **33**. *See* Figure 12. The plurality of composite sheet units **50** are laminated and the laminated composite sheets are integrated. *See* Figure 12 and page 26, lines 7-22.

Electrodes **92** provided on both sides of the piezocomposite **9**. *See* Figure 22. The piezocomposite **9** is interposed between an acoustic matching layer **90** and a backing member **91**. One of the electrodes **92** is grounded, while the other electrode **92** is connected as a driving

electrode with a transmitting/receiving circuit **93**. *See* Figure 22 and page 46, line 25 through page 47, line 10.

The ultrasonic diagnostic equipment main body **101** includes a transmitting section **94** and a receiving section **95** that are connected with lines lead from the electrodes **92** on the both sides. *See* Figure 23 and page 47, lines 12-28. A controlling section **96** is connected with the transmitting section **94** and the receiving section **95**. An image forming section **23** is connected with the receiving section **95** and the controlling section **96**. An image display device **98** is connected with the image forming section **97**. *See* Figure 23 and page 47, lines 12-28.

D. Independent Claim 35

Independent claim 35 is directed to a piezocomposite comprising a plurality of composite sheet units **50**. Each of the composite sheet units **50** includes a resin layer **22** and a plurality of sintered piezoelectric thin wires **33** arranged in a uniform direction on a surface of the resin layer **22**. *See* Figure 11 and page 26, lines 32-36. The sintered piezoelectric thin wires **33** are positioned between the resin layers **22**. *See* Figure 12. The plurality of composite sheet units **50** are cut in a direction perpendicular to a lengthwise direction of the sintered piezoelectric thin wires **33**. *Id.* The plurality of composite sheet units **50** are laminated and the laminated composite sheets are integrated. *See* Figure 12 and page 26, lines 7-22.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-13, 34, and 35 stand rejected as being obvious over U.S. Patent No. 5,539,965 (Safari) in view of U.S. Patent No. 5,175,709 (Slayton).

VII. ARGUMENT

For the reasons discussed in detail below, Appellants submit that the disclosures of Safari and Slayton fail to establish a prima facie case of obviousness of the present invention of independent claims 1, 12, 13, and 35.

A. The Reference Disclosures

Safari relates to a method for making piezoelectric composites. Safari discloses that a composite can be made by laminating sheets **11, 13, 15, 19, 21** with spacers **12, 14, 16, 18, 20, 22, 24, 26**. *See* Figure 1, and column 5, lines 1-3. The gaps between the laminating sheets are filled with polarizable or non-polarizable filler. *See* col. 5, lines 32-34. The resulting stack **10** is diced and portions removed. *See* Figure 3. Then the diced stack **10** is refilled with a filler material. *See* Figure 4, and col. 6, lines 1-4.

Accordingly, Safari does not teach or suggest at least the following:

- the lamination and integration of a plurality of composite sheet units; and
- the formation of void portions between adjacent sintered piezoelectric thin wires that are arranged on a surface of a resin layer.

Slayton is directed to an ultrasonic transducer. Slayton discloses that piezoelectric material **32** and wave suppression material **34** are disposed along a lateral or radial direction. *See* Figures 3, 4, 5, and 6, and col. 4, lines 31-37. Slayton does not teach or suggest that composite sheet units are laminated and integrated together.

Slayton discloses that separation material **14** can be disposed between transmitter and receiver segments of piezoelectric material **10, 12**. See Figures 1 and 2, and col. 3, line 66 through col. 4, line 2. Slayton further notes that the separation material may be air. See col. 1, lines 54-57. However, Slayton does not teach the formation of void portions between adjacent sintered piezoelectric thin wires that are arranged on a surface of a resin layer. Separation material **14** is not between adjacent sintered piezoelectric thin wires. Rather, separation material **14** is formed between transmitter and receiver segments.

Accordingly, Slayton also does not teach or suggest at least the following:

- the lamination and integration of a plurality of composite sheet units; and
- the formation of void portions between adjacent sintered piezoelectric thin wires that are arranged on a surface of a resin layer.

B. Claim 1 is Not Obvious over the Combination of Safari and Slayton

Claim 1 requires a piezocomposite comprising a plurality of composite sheet units. Each composite sheet unit includes a resin layer and a plurality of sintered piezoelectric thin wires arranged in a uniform direction on a surface of the resin layer. In each of the composite sheet units, the sintered piezoelectric thin wires are arranged on a surface of each resin layer so as to have void portions between adjacent ones of the sintered piezoelectric thin wires. The plurality of composite sheet units are laminated and the laminated composite sheets are integrated.

By laminating the composite sheet units in the manner recited in claim 1, greater flexibility of the piezocomposite can be imparted. This is because the areas of lamination permit greater flexibility of the laminated structure than would otherwise be permitted in a non-laminated, solid structure.

Safari does not teach or suggest the lamination of a plurality of composite sheet units so they are integrated. Rather, Safari teaches that a single, non-laminated stack is formed by filling in a diced stack with a filler material (e.g., by pouring or immersion of the stack). *See* Figure 4 and col. 6, lines 1-5. The resulting structure, therefore, has no distinct layers. *See* Figure 4. In contrast, the invention of claim 1 requires the lamination of composite sheet units—that is, distinct layers that are adhered together. Accordingly, Safari does not teach or suggest the lamination and integration of a plurality of composite sheets.

Nor does Safari teach or suggest that sintered piezoelectric thin wires are arranged on a surface of each resin layer so as to have void portions between adjacent ones of the sintered piezoelectric thin wires.

Accordingly, Appellants respectfully submit that claim 1 is allowable over Safari.

Slayton does not remedy the deficiencies of Safari. Slayton also does not teach or suggest the lamination of a plurality of composite sheet units. Claim 1 requires a plurality of composite sheet units, each of which include a resin layer and a plurality of sintered piezoelectric thin wires. Slayton does not disclose any such composite sheet units. The piezoelectric material **32** of Slayton is a layer in itself. *See* Figure 4. None of the layers of piezoelectric material **32**, however, can be considered a plurality of the piezoelectric material **32** that is arranged on a surface of a resin layer, as required by claim 1. Rather, Slayton merely discloses that piezoelectric material is disposed adjacent to wave suppression material. *See* Figure 3. Accordingly, Slayton does not teach or suggest forming composite sheet units that include a resin layer and sintered piezoelectric thin wires.

Nor does Slayton teach or suggest the lamination of composite sheet units as required by claim 1. Since the piezoelectric material 32 of Slayton is formed in layers, Slayton does not teach or suggest the composite sheet units of claim 1. Accordingly, Slayton also cannot teach or suggest the lamination of any composite sheet units.

Moreover, Slayton does not teach or suggest the formation of voids as required by claim 1. As noted above, Slayton only teaches that air may be used as a separation material between a receiver and transmitter section. Slayton does not teach that voids may be formed between adjacent sintered piezoelectric thin wires.

Thus, the combination of Safari and Slayton would not result in the invention recited in claim 1. Claims 2-11 and 34 depend from claim 1, and are allowable for at least the same reasons.

C. Claim 12 is Not Obvious over the Combination of Safari and Slayton

Claim 12 is directed to an ultrasonic probe for an ultrasonic diagnostic equipment. A piezocomposite is obtained by laminating and integrating a plurality of composite sheet units. Each composite sheet unit includes a resin layer and a plurality of sintered piezoelectric thin

wires arranged in a uniform direction on a surface of the resin layer. The plurality of composite sheet units are laminated and the laminated composite sheets are integrated.

By laminating the composite sheet units in the manner recited in claim 12, greater flexibility of the piezocomposite can be imparted. This is because the areas of lamination permit greater flexibility of the laminated structure than would otherwise be permitted in a non-laminated, solid structure.

Safari does not teach or suggest the lamination of a plurality of composite sheet units so they are integrated. Rather, Safari teaches that a single, non-laminated stack is formed by filling in a diced stack with a filler material (e.g., by pouring or immersion of the stack). *See* Figure 4 and col. 6, lines 1-5. The resulting structure, therefore, has no distinct layers. *See* Figure 4. In contrast, the invention of claim 12 requires the lamination of composite sheet units—that is, distinct layers that are adhered together. Accordingly, Safari does not teach or suggest the lamination and integration of a plurality of composite sheets.

Slayton does not remedy the deficiencies of Safari. As discussed above in detail with respect to claim 1, Slayton also does not teach or suggest the lamination of a plurality of composite sheets. In particular, as noted above with respect to claim 1, Slayton does not teach or suggest the formation of composite sheet units that include a resin layer and sintered piezoelectric thin wires. Nor does Slayton teach or suggest the lamination of such composite sheet units. Accordingly, Appellants respectfully submit that claim 12 is allowable over the cited references.

D. Claim 13 is Not Obvious over the Combination of Safari and Slayton

Claim 13 is directed to an ultrasonic diagnostic equipment. The ultrasonic probe includes a piezocomposite, obtained by laminating and integrating a plurality of composite sheet units. Each of the composite sheet units includes a resin layer and a plurality of sintered piezoelectric thin wires arranged in a uniform direction on a surface of the resin layer. The plurality of composite sheet units are laminated and the laminated composite sheets are integrated.

By laminating the composite sheet units in the manner recited in claim 13, greater flexibility of the piezocomposite can be imparted. This is because the areas of lamination permit greater flexibility of the laminated structure than would otherwise be permitted in a non-laminated, solid structure.

Safari does not teach or suggest the lamination of a plurality of composite sheet units so they are integrated. Rather, Safari teaches that a single, non-laminated stack is formed by filling in a diced stack with a filler material (e.g., by pouring or immersion of the stack). *See* Figure 4 and col. 6, lines 1-5. The resulting structure, therefore, has no distinct layers. *See* Figure 4. In contrast, the invention of claim 13 requires the lamination of composite sheet units—that is, distinct layers that are adhered together. Accordingly, Safari does not teach or suggest the lamination and integration of a plurality of composite sheets.

Slayton does not remedy the deficiencies of Safari. As discussed above in detail with respect to claim 1, Slayton also does not teach or suggest the lamination of a plurality of composite sheets. In particular, as noted above with respect to claim 1, Slayton does not teach or suggest the formation of composite sheet units that include a resin layer and sintered piezoelectric thin wires. Nor does Slayton teach or suggest the lamination of such composite sheet units. Accordingly, Appellants respectfully submit that claim 13 is allowable over the cited references.

E. Claim 35 is Not Obvious over the Combination of Safari and Slayton

Claim 35 is directed a piezocomposite comprising a plurality of composite sheet units, each of which includes a resin layer and a plurality of sintered piezoelectric thin wires arranged in a uniform direction on a surface of the resin layer. The plurality of composite sheet units are laminated and the laminated composite sheets are integrated.

By laminating the composite sheet units in the manner recited in claim 35, greater flexibility of the piezocomposite can be imparted. This is because the areas of lamination permit

greater flexibility of the laminated structure than would otherwise be permitted in a non-laminated, solid structure.

Safari does not teach or suggest the lamination of a plurality of composite sheet units so they are integrated. Rather, Safari teaches that a single, non-laminated stack is formed by filling in a diced stack with a filler material (e.g., by pouring or immersion of the stack). *See* Figure 4 and col. 6, lines 1-5. The resulting structure, therefore, has no distinct layers. *See* Figure 4. In contrast, the invention of claim 35 requires the lamination of composite sheet units—that is, distinct layers that are adhered together. Accordingly, Safari does not teach or suggest the lamination and integration of a plurality of composite sheets.

Slayton does not remedy the deficiencies of Safari. As discussed above in detail with respect to claim 1, Slayton also does not teach or suggest the lamination of a plurality of composite sheets. In particular, as noted above with respect to claim 1, Slayton does not teach or suggest the formation of composite sheet units that include a resin layer and sintered piezoelectric thin wires. Nor does Slayton teach or suggest the lamination of such composite sheet units. Accordingly, Appellants respectfully submit that claim 35 is allowable over the cited references.

VIII. SUMMARY

It is earnestly requested that the Examiner's rejection be reversed, and that all of the pending claims be allowed.

Please charge any additional fees or credit overpayment to Merchant & Gould Deposit Account No. 13-2725.

Respectfully submitted,

MERCHANT & GOULD P.C.
P.O. Box 2903
Minneapolis, Minnesota 55402-0903
(612) 332-5300

Date: October 18, 2004

By: _____
Name: Douglas P. Mueller
Reg. No.: 30,300
DPM/DTL

CLAIMS APPENDIX

1. A piezocomposite comprising a plurality of composite sheet units, each of which includes a resin layer and a plurality of sintered piezoelectric thin wires arranged in a uniform direction on a surface of the resin layer, so that the sintered piezoelectric thin wires are positioned between the resin layers, and cutting the same in a direction perpendicular to a lengthwise direction of the sintered piezoelectric thin wires,

wherein in each of the composite sheet units, the sintered piezoelectric thin wires are arranged on a surface of each resin layer so as to have void portions between adjacent ones of the sintered piezoelectric thin wires, and

the plurality of composite sheet units are laminated and the laminated composite sheets are integrated.

2. The piezocomposite according to claim 1, wherein the composite sheet unit includes two resin layers and a plurality of sintered piezoelectric thin wires arranged in a uniform direction between the two resin layers.

3. The piezocomposite according to claim 1, wherein resin-impregnated-cured portions are present between the sintered piezoelectric thin wires.

4. The piezocomposite according to claim 1, wherein each resin layer is composed of a plurality of constituent resin layers.

5. The piezocomposite according to claim 1, wherein each of the sintered piezoelectric thin wires is in a prismatic shape having a polygonal cross section with an average edge length of 10 μm to 500 μm and having a length of 0.05 mm to 3 mm.

6. The piezocomposite according to claim 5, wherein the prismatic shape with a polygonal cross section is a prismatic shape having a trapezoidal cross section.

7. The piezocomposite according to claim 1, wherein the number of the sintered piezoelectric thin wires arranged on one surface of the resin layer is in a range of 10 to 3000.

8. The piezocomposite according to claim 1, wherein the number of the laminated resin layers is in a range of 20 to 1500.

9. The piezocomposite according to claim 1, wherein the number of the sintered piezoelectric thin wires arranged in a uniform direction in the piezocomposite is in a range of 200 to 4500000.

10. The piezocomposite according to claim 1, wherein a cut surface is ground.

11. The piezocomposite according to claim 1, wherein the sintered piezoelectric thin wires have cut surfaces in the lengthwise direction.

12. An ultrasonic probe for an ultrasonic diagnostic equipment, comprising:

a piezocomposite, obtained by laminating and integrating a plurality of composite sheet units, each of which includes a resin layer and a plurality of sintered piezoelectric thin wires arranged in a uniform direction on a surface of the resin layer, so that the sintered piezoelectric thin wires are positioned between the resin layers, and cutting the same in a direction perpendicular to a lengthwise direction of the sintered piezoelectric thin wires, wherein the plurality of composite sheet units are laminated and the laminated composite sheets are integrated;

electrodes provided on both sides of the piezocomposite;

an acoustic matching layer; and

a backing member,

wherein:

the piezocomposite is interposed between the acoustic matching layer and the backing member; and

one of the electrodes is grounded, while the other electrode is connected as a driving electrode with a transmitting/receiving circuit.

13. An ultrasonic diagnostic equipment, comprising:

an ultrasonic diagnostic equipment main body; and

an ultrasonic probe for an ultrasonic diagnostic equipment, connected with the ultrasonic diagnostic equipment main body,

wherein:

the ultrasonic probe includes:

a piezocomposite, obtained by laminating and integrating a plurality of composite sheet units, each of which includes a resin layer and a plurality of sintered piezoelectric thin wires arranged in a uniform direction on a surface of the resin layer, so that the sintered piezoelectric thin wires are positioned between the resin layers, and cutting the same in a direction perpendicular to a lengthwise direction of the sintered piezoelectric thin wires, wherein the plurality of composite sheet units are laminated and the laminated composite sheets are integrated;

electrodes provided on both sides of the piezocomposite;

an acoustic matching layer; and

a backing member,

wherein:

the piezocomposite is interposed between the acoustic matching layer and the backing member; and

one of the electrodes is grounded, while the other electrode is connected as a driving electrode with a transmitting/receiving circuit; and,

the ultrasonic diagnostic equipment main body includes:

a transmitting section and a receiving section that are connected with lines lead from the electrodes on the both sides;

a controlling section connected with the transmitting section and the receiving section;

an image forming section connected with the receiving section and the controlling section; and

an image display device connected with the image forming section.

34. The piezocomposite according to claim 1, wherein resin-impregnated-cured portions are provided in the void-portions.

35. A piezocomposite comprising a plurality of composite sheet units, each of which includes a resin layer and a plurality of sintered piezoelectric thin wires arranged in a uniform direction on a surface of the resin layer, so that the sintered piezoelectric thin wires are positioned between the resin layers, and cutting the same in a direction perpendicular to a lengthwise direction of the sintered piezoelectric thin wires,

wherein the plurality of composite sheet units are laminated and the laminated composite sheets are integrated.

EVIDENCE APPENDIX

A. OFFICE ACTION

1. Advisory Action -- mailed July 28, 2004.
2. Final Office Action -- mailed March 29, 2004.

B. REFERENCES RELIED UPON BY THE EXAMINER

1. U.S. Patent No. 5,539,965 (Safari)
2. U.S. Patent No. 5,175,709 (Slayton)

DTL

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,640	01/22/2002	Seigo Shiraishi	10873.867US01	9430

23552 7590 07/28/2004

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EXAMINER	
AGUIRRECHEA, JAYDI A	
ART UNIT	**PAPER NUMBER**
2834	

DPM

DATE MAILED: 07/28/2004

FR 6 mo: Sept 29, 2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PROLAW

Advisory Action	Application No.	Applicant(s)	
	10/055,640	SHIRAISHI ET AL.	
	Examiner	Art Unit	
	Jaydi A. Aguirrechea	2834	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 29 June 2004 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

a) ☒ The period for reply expires *3* months from the mailing date of the final rejection.

b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection. ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.

2. ☐ The proposed amendment(s) will not be entered because:

   (a) ☐ they raise new issues that would require further consideration and/or search (see NOTE below);

   (b) ☐ they raise the issue of new matter (see Note below);

   (c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

   (d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: _____.

3. ☐ Applicant's reply has overcome the following rejection(s): _____.

4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

5. ☒ The a)☐ affidavit, b)☐ exhibit, or c)☒ request for reconsideration has been considered but does NOT place the application in condition for allowance because: *See Continuation Sheet*.

6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.

7. ☒ For purposes of Appeal, the proposed amendment(s) a)☒ will not be entered or b)☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

   The status of the claim(s) is (or will be) as follows:

   Claim(s) allowed: _____.

   Claim(s) objected to: _____.

   Claim(s) rejected: *1-13,34 and 35*.

   Claim(s) withdrawn from consideration: *14-33*.

8. ☐ The drawing correction filed on _____ is a)☐ approved or b)☐ disapproved by the Examiner.

9. ☒ Note the attached Information Disclosure Statement(s)(PTO-1449) Paper No(s). *5/20/04,6/26/04*.

10. ☐ Other: _____

Continuation of 5. does NOT place the application in condition for allowance because: the arguments presented by Applicants requieres further search and/or consideration. It is the Examiner's position that an air layer could be considered a void.

THOMAS M. DOUGHERTY
PRIMARY EXAMINER
GROUP 2100

Date Mailed: March 23, 2004

FORM 1449* INFORMATION DISCLOSURE STATEMENT IN AN APPLICATION (Use several sheets if necessary)	Docket Number: 10873.867US01	Application Number: 10/055,640
	Applicant: SHIRAISHI et al.	
	Filing Date: January 22, 2002	Group Art Unit: Unknown

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
JA	5,340,510	08.1994	BOWEN	264	22	

FOREIGN PATENT DOCUMENTS

	DOCUMENT NO.	DATE	COUNTRY	~~CLASS~~	~~SUBCLASS~~ IPC	TRANSLATION YES	TRANSLATION NO
JA	0 642 036	03.1995	EP	G01S	15/69		

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

JA		"Composite Piezoelectric Materials for Medical Ultrasonic Imaging Transducers-A Review" by Wallace Arden Smith, ISAF '86. PROCEEDINGS OF THE SIXTH IEEE INTERNATIONAL SYMPOSIUM ON APPLICATIONS OF FERROELECTRICS, pp. 249-256 (1986)

23552
PATENT TRADEMARK OFFICE

EXAMINER	DATE CONSIDERED
	7/22/04

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form for next communication to the Applicant.

*Substitute Disclosure Statement Form (PTO-1449)

Date Mailed: May 20, 2004

FORM 1449 INFORMATION DISCLOSURE STATEMENT IN AN APPLICATION (Use several sheets if necessary)	Docket Number: 10873.867US01	Application Number: 10/055,640
	Applicant: SHIRAISHI et al.	
	Filing Date: January 22, 2002	Group Art Unit: 2834

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
JAA	4,683,396	07.1987	TAKEUCHI et al.	310	358	

FOREIGN PATENT DOCUMENTS

	DOCUMENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
						YES	NO
JAA	3437 862	05.1985	Germany			See IDS	

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

JAA		European Search Report for Application EP 02001590 dated May 6, 2004

23552
PATENT TRADEMARK OFFICE

EXAMINER	DATE CONSIDERED 7/22/04

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form for next communication to the Applicant.

*Substitute Disclosure Statement Form (PTO-1449)

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,640	01/22/2002	Seigo Shiraishi	10873.867US01	9430

23552 7590 03/29/2004

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MINNEAPOLIS, MN 55402-0903

EXAMINER	
AGUIRRECHEA, JAYDI A	

ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/055,640	SHIRAISHI ET AL.	
	Examiner	Art Unit	
	Jaydi A. Aguirrechea	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) *14-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,34 and 35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-13, 34 and35 rejected under 35 U.S.C. 103(a) as being unpatentable over Safari et al. (US 5539965) in view of Slayton et al (US 5175709).

Safari et al. disclose a piezocomposite (Figures 1-7) comprising a plurality of composite sheet units (11, 13, 15, 19) including resin layers (32, 34, 36, 38) and a plurality of piezoelectric thin wires (42, 44, 46, 48) arranged in uniform direction on a surface of the resin layer.

However, Safari fails to disclose the structure wherein in each of the composite sheet units, the sintered piezoelectric thin wires are arranged on a surface of each resin layer so as to have void portions between adjacent ones of the sintered piezoelectric thin wires, and the plurality of composite sheet units are laminated and the laminated composite sheets are integrated.

Slayton discloses a piezocomposite structure wherein in each of the composite sheet units, the sintered piezoelectric thin wires are arranged on a surface of each resin layer so as to have void portions between adjacent ones of the sintered piezoelectric thin wires, and the plurality of composite sheet units are laminated and the laminated composite sheets are integrated. Slayton discloses that the spaces between the piezoelectric materials could be filled with ultrasonic suppression materials such as air, fiberglass or an electrically insulating epoxy or a combination of these materials (Column 1, lines 54-57). These layers are laminated and integrated. Therefore, it would have been obvious at the time of the invention was made to use

the resin layer having void portions adjacent to the piezoelectric wires for the purpose of reducing undesirable cross coupling by providing a composite core (Column 1) as taught by Slayton.

3. With regards to claim 2, Safari discloses two layers of resin layers (32, 34).

4. With regards to claim 3, Safari discloses a filler material between the piezoelectric wires.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Safari.

Safari discloses the claimed invention except for the resin layer is composed of a plurality of constituent resin layers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use two layers of resin, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 PSQ 8.

6. With regards to claims 5-9, Safari discloses the possibility of having different shapes (Column 5, lines 16-26) and effective thickness between 5 and 5000 microns.

7. With regards to claim 10, Safari discloses electrodes, where one of the could be grounded (Column 6, lines 1-10).

8. With regards to claim 11, the piezoelectric thin wires have cut surfaces in the lengthwise direction (Figures 6-7).

9. With regards to claims 12 and 13, Safari and Slayton discloses his invention as being directed to ultrasound transducers used in medical imaging with composite sheets laminated and integrated.

10. With regards to claim 34, the combination of Safari et al. (US 5539965) and Slayton et al (US 5175709) discloses the resin portions provided in the void portions

11. With regards to claim 35, the combination of Safari et al. and Slayton discloses the claimed invention as disclosed above for claims 1, 12 and 13.

Response to Arguments

12. Applicant's arguments, see page 1, filed on 1/26/04, with respect to the rejection(s)of claim(s) 1, 12, 13 and 35 under USC 102 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Safari et al. and Slayton.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jaydi A. Aguirrechea whose telephone number is 571-272-2018. The examiner can normally be reached on M-Th 9-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren E. Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JAA
3/22/04

Thomas M. Dougherty
THOMAS M. DOUGHERTY
PRIMARY EXAMINER
GROUP 2800